FACT SHEET FOR NPDES PERMIT WA 000298-4

TOSCO CORPORATION

a subsidiary of

PHILLIPS PETROLEUM COMPANY

SUMMARY

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in a **Response to Comments** letter and sent to all interested parities**.**

GENERAL INFORMATION	
Applicant	Tosco Corporation a wholly owned subsidiary of Phillips Petroleum Company
Facility Name and Address	Phillips 66 Company Ferndale Refinery P.O. Box 8 Ferndale, Washington 98248
Type of Facility:	Petroleum Refinery
SIC Code	2911
Discharge Location Outfall 001 Outfall 002	Waterbody name: Strait of Georgia Latitude: 48° 49' 36" N Longitude: 122° 42' 57" W Waterbody name: Unnamed stream to Lummi Bay Latitude: 48° 49' 11" N Longitude: 122° 41' 03" W
Water Body ID Number	Outfall 001: WA-01-0010 Outfall 002: AT56DW

This refinery is located on the northwestern coast of Washington along the Strait of Georgia between Cherry Point and Sandy Point. The facility is located in Whatcom County and is approximately five miles west-southwest of the city of Ferndale. The refinery's process and domestic wastewater is treated and then discharged via a diffuser pipe (Outfall 001) that extends 1000 feet west from the shoreline to the Strait of Georgia. The diffuser is supported in place along Phillip's shipping pier. Some of the stormwater is collected and discharged to a roadside ditch (Outfall 002) which then flows to an unnamed stream, through a grassy swale area, and finally discharges to Lummi Bay.

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

Construction of this facility began in 1954 and there have been a couple of changes in ownership and/or management since that time. On December 28, 1993, Ecology received notification that Tosco Corporation had purchased the refinery from BP Oil Company and had plans to continue operating the refinery to process crude oil as Tosco Northwest Company (Tosco). The conditions and requirements of the NPDES permit issued to BP Oil on March 1, 1990 were transferred to the Tosco operation at the Ferndale refinery. The 1990 NPDES permit has remained in effect until now and will be replaced with the permit that has been developed as described in this fact sheet. Tosco submitted an application for renewal of the NPDES Permit (WA-000298-4) on August 30, 1994. On September 17, 2001, Ecology received notification that Phillips Petroleum had completed its purchase of Tosco Corporation. Tosco Corporation is a wholly owned subsidiary of Phillips Petroleum Company. The Ferndale Refinery will be doing business as Phillips 66 Company. Phillips or Ferndale Refinery will be used in this Fact Sheet to refer to current and historical owners. EPA classifies this facility as a major industrial facility.

INDUSTRIAL PROCESS

At the end of 1993, as a holding of BP Oil, an average of 74,000 barrels (bbls) per day of crude oil was processed. Currently the Ferndale Refinery Ferndale refinery has the capacity to process approximately 95,000 bbls per day of crude oil. From January 1991 through March of 2001 the daily throughput of crude oil ranges from a low of 70,870 bbls to a high of 95,360 bbls, excluding turnarounds (crude oil processing equipment maintenance) periods. During this same period the highest average throughput for any consecutive 12-month period (11/97-10/98) was 89,530 bbls per day. The main source of crude oil is from tankers delivering oil from Alaska's Prudhoe Bay oil field. The refinery separates crude oil into its various component parts. Separated components are further processed and blended into a variety of petroleum products. Those products include gasoline, jet fuel, diesel oil, liquid petroleum gas, residual fuel oil, and marine bunker fuel oil. The refinery currently employs about 287 people with an additional 150 contract employees. The indirect employment associated with the refinery is about 850 people. The refinery operates 24 hours per day and 365 days per year, except during turnaround periods which occur about once every two to three years. The refinery runs two 12 hours shifts per day.

WASTEWATER SOURCES AND TREATMENT

All process water, sanitary wastewater, collected stormwater, and ballast water is discharged via a 0.55 meter (about 22-inch) diameter multi-port submerged diffuser at Outfall 001. The refinery process water receives primary and secondary treatment in a wastewater treatment system consisting of three surge tanks (a chemical water surge tank, a chemical water retention tank, and a oily water surge tank), two parallel API oil/water separators, two parallel induced gas flotation units (IGFs), two parallel sludge aeration basins, a four arm trickling filter, four aeroaccelerators or aerated clarifiers (one large treating 50 % of the flow, one medium treating 35 % of the flow and two small treating 7.5 % of the flow each), a clarification pond, a catchment basin, a dewatering basin, a stormwater surge basin, and a final holding pond The solids which settle out in the clarification pond and catchment basin are periodically removed and disposed of in the dewatering basin, an on-site non-hazardous landfarm.

A second collection system conveys non-process stormwater to an observation channel, where any oil can be skimmed and the flow can be diverted to the storm water surge basin and then to the oily water surge tank. The stormwater is normally discharged from the observation channel to the catchment basin.

Stormwater runoff from the process areas and process wastewaters are commingled in the catchment basin and then discharged out Outfall 001. In the event that final effluent does not meet specifications and cannot be discharged, the final effluent can be diverted to the emergency wastewater holding pond (spill basin) until it can be returned for additional treatment. The discharge is pumped into the Strait of Georgia on a continual basis and generally ranges between 1.5 to 2.5 million gallons per day, with an average of 1.52 MGD. The highest daily discharge since January of 1991 was 6.36 million gallons per day, which occurred in November of 1995.

DISCHARGE OUTFALL

Phillip's treated wastewater is discharged to the Strait of Georgia via an outfall pipe which runs underground from the final holding pond to the shoreline of the strait. This outfall line also conveys treated wastewater from Tenaska, a cogeneration facility for steam and electricity, to the Strait of Georgia with an average flow of 177,000 gallons per day. From the shoreline, the outfall line is suspended and extends approximately 1000 feet under Phillip's pier where it then turns down at a ninety degree angle and goes to a submerged diffuser. The diffuser has four ports, which discharge on a horizontal plain. The ports are pointed at right angles to each other on the horizontal plain and are approximately eight and one half inches is diameter. The diffuser is at a –31.0 foot MLLW and is 1.4 feet from the bottom of the seabed.

PERMIT STATUS

The previous permit for this facility was issued on March 1, 1990 and the effluent limitations for the discharge were as shown in the following tables:

PROCESS WASTEWATER DISCHARGE 001		
PARAMETER	DAILY AVERAGE	DAILY MAXIMUM
Biochemical Oxygen Demand (Lbs./day)	350	640
Chemical Oxygen Demand (Lbs./day)	2450	4750
Total Suspended Solids (Lbs./day)	280	440
Oil and Grease (mg/l)		10
Oil and Grease (Lbs./day)	100	190
Phenolic Compounds (Lbs./day)	2.2	4.7
Ammonia as N (Lbs./day)	210	460
Sulfide (Lbs./day)	1.9	4.1

PROCESS WASTEWATER DISCHARGE 001		
Total Chromium (Lbs./day)	2.9	7.7
Hexavalent Chromium (Lbs./day)	0.2	0.5
Fecal Coliform (Colonies/100 mls.)	200	400
PH	Within the range of 6.0 to 9.0	

BALLAST WATER ALLOCATION at OUTFALL 001		
PARAMETER	DAILY AVERAGE	DAILY MAXIMUM
Biochemical Oxygen Demand (Lbs./Million gallons)	210	400
Chemical Oxygen Demand (Lbs./Million gallons)	2000	3900
Total Suspended Solids (Lbs./Million gallons)	170	260
Oil and Grease (Lbs./Million gallons)	67	126

STORMWATER ALLOCATION at OUTFALL 001		
PARAMETER	DAILY AVERAGE	DAILY MAXIMUM
Biochemical Oxygen Demand (Lbs./Million gallons)	220	400
Chemical Oxygen Demand (Lbs./Million gallons)	1500	3000
Total Suspended Solids (Lbs./Million gallons)	180	280
Oil and Grease (Lbs./Million gallons)	67	130
Phenolic Compounds (Lbs./Million gallons)	1.4	2.9
Total Chromium (Lbs./Million gallons)	1.8	5.0
Hexavalent Chromium (Lbs./Million gallons)	0.23	0.52

An application for permit renewal was submitted to the Department on August 30, 1994 and additional information was submitted on February 23, 1995 (for stormwater section), and on October 5, 1998 and April 16, 2001 (for updated production and flow rates).

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility last received a sampling inspection on August 21, 2001, which included splitting the facility's composite sample of the process wastewater and stormwater and collecting grab samples of both discharges. The discharge was found to be well within permit limits. The last non-sampling inspection was completed on June 1, 2001.

During the history of the previous permit, the Permittee has generally remained in compliance based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. The following table summarizes the incidents of noncompliance:

OUTFALL 001	PARAMETER	EXPLANATION OF NON-COMPLIANCE
12/20/1995	Fecal Coliform	Permit Limit: 400 colonies/100 mls – Test results: 640 colonies/100 mls. In the past, high fecal coliform levels were traced to bird droppings in the stormwater pond. This was the first time in history high levels have been detected in the biosystem effluent.
12/21/1995	Fecal Coliform	Permit Limit: 400 colonies/100 mls – Test results: 860 colonies/100 mls. In the past, high fecal coliform levels were traced to bird droppings in the stormwater pond. This was the first time in history high levels have been detected in the biosystem effluent.
12/13/1996	Phenol – Daily Max.	Permit Limit: 4.7 lbs./day - Test result: 12.2 lbs./day. Testing of upstream ponds and the treatment system did not reveal any sources of the elevated phenol levels. No problems were found with the sampling or laboratory analysis. All other daily values for the month were less than 0.7 lbs./day.
1/5/1997	Phenol – Daily Max.	Permit Limit: 4.7 lbs./day - Test result: 14.7 lbs./day. For this event, Tosco was discharging a large amount of stormwater due to heavy rainfall and snowmelt. Testing of the ponds and treatment system revealed elevated phenols in the stormwater pond. A mix-up in routing phenolic wastewater to the stormwater pond was the source.

The facility was last inspected by Ecology's laboratory accreditation staff on March 27, 1998 and was originally accredited effective November 1, 1991 and was last accredited on December 13, 2000. Phillips is accredited for testing Ammonia (Method 4500-NH3-F), Biochemical Oxygen Demand (Method 5210), Dissolved Oxygen (Method 4500-O-G), Chemical Oxygen Demand (Method 410.4(7.3)), Oil & Grease (Method 1664), pH (Method 150.1), Phenol (Method 420.1(8.2)), Total Suspended Solids (Method 160.2), Sulfide (Method 136.2), Hexavalent Chrome (Method 3500-CR-D) and Fecal Coliform (Method 600/8-78-017).

The previous permit also required several special studies to be completed during the permit term. Submittals required by the permit are included in the following table:

Submittal Requirement	**Date Required**	**Date Submitted**
Salmonid bioassay	Semiannually	Twice per year
Update Solid Waste Control Plan	9/1/90	9/1/90
Update Treatment System Operating Plan	9/1/90	9/1/90
Update SPCC Plan	9/1/90 and annual update thereafter	8/90 and annually since
Stormwater Runoff Discharge Sampling Plan	9/1/90	8/90, Ecology comments 12/92, Revised 11/93
Stormwater Runoff Study	120 days after Department approval of Plan	Approved 11/93, Submitted 3/94
Cyanide Study	Sample twice per week for six months beginning on 3/5/90	3/7/90
Cyanide Study Report	Within 60 days of completion of study	10/12/90
Dilution Ratio Study Plan	7/1/90	6/28/90
Dilution Ratio Study	3/1/91	Summer 1990
Dilution Ratio Study Report	Within 90 days of completion of Study	12/10/90
Acute Biomonitoring Study	Conducted every other month for one year starting 9/1/90	9/90
Acute Biomonitoring Study Report	Within 60 days after each sampling interval	Final report 9/91
Chronic Biomonitoring Study	Conducted in the second year of permit 3/1/91 to 3/1/92	3/91

Submittal Requirement	Date Required	Date Submitted
Chronic Biomonitoring Study Report	Within 60 days after each sampling interval	4/92
Chemical analysis of influent and effluent	Within second year of permit 3/1/91 to 3/1/92	5/91 and 7/91
Report of chemical analysis of influent and effluent	Within 120 day of initial sampling	9/91
Submit study plan for chemical analysis, acute biomonitoring and benthic macroinvertebrate study of sediment	9/1/91	8/91
Conduct sediment study	Within third year of permit term 3/1/92 to 3/1/93	7/92
Submit report on results of sediment study	Within 120 days of initial sampling.	11/92
Conduct particulate monitoring study	Upon written notification from Ecology	Not done by Ecology
Submit report on results of particulate monitoring study	Within 9 months of the date of written notification from Ecology	N/A
NPDES permit renewal application form and updated Solid Waste Control Plan	9/1/94	8/30/94

SPILL EVENTS

There were eleven (11) spills reported by Tosco since January 1995. Four (4) of the spills were weather related; five (5) were due to seal, gasket, and level indicator failures; and two (2) were due to operator or maintenance errors. Two (2) of the spills impacted the marine waters and the remainder of the spills were contained and cleaned up. The following is a list of the spills (1 bbl. is equivalent to 42 gallons):

Date	Amount	Material Spilled	Location of Spill	How Resolved
8/28/95	1500 gallon	100:1: Gasoline: corrosion inhibitor.	Under pipeway, north of Pump Pad # 4, to containment.	Failed gasket, shutdown gasoline blending, replaced failed gasket, vacuum trucked hydrocarbons liquids, soap-water washed soils and routed to water treatment system.
10/31/95	4 bbl	Oily Sewer Slop oil (mix of crude, various raw fractions of gasoline, distillates, fuel oil, and tank drains).	Manhole CC - 10' SE of Oily Lift Station, to containment.	Excavated manhole and found leaking (@grout & seals) to plugged blind leg of spill sewer. Isolated manhole and excavated contaminated soil and replaced manhole w/ new unit. Installed suck out wells for rainy season.
5/21/96	20 bbl	Jet Fuel (kerosene)	In pipeway at top of cut to beachhead.	Leaking spool piece gasket. Shutdown system, replaced gaskets and contoured pipeway soil for clean draining to south beachhead storm basin. Soap-Water washed jet fuel to basin. Boomed & skimmed basin to collect jet.
10/28/96	5000 gallon	Oily process water.	North Manhole on overflow line at top of cut.	Intense rain. Stormwater over ran lift stations and filled overflow tank at beachhead. Overflow tank inlet valve closed, water filled overflow line and pressured manhole. Manhole overflowed and waters escaped to ground, down south ditch of cut to south storm basin. Diesel pump was set to pump to spill basin and flow was stopped to overflow line. After storm area was soap-water washed clean to vacuum trucks and manhole was repaired.
1/1/97	2066 bbl	Slop oil and water.	Suction line of tank 100x96, to containment.	Suction line for Tank 100x96 froze and split during freeze/snowstorm. When operators started transfer, the receiving tank gauge did not respond properly. Found leak while checking line for blockage. Started clean up, oil flowed to tank farm storm sump and was vacuum trucked back into another tank. After the stor when the snow melted the area was thoroughly washed to sump and the line replaced. Later the stained soil was excavated and landfarmed.
8/5/97	15-30 bbl	Mixture of water and Marine Fuel Oil (MFO).	From Dock/marine terminal sumps into Puget Sound	Valves incorrectly lined up. During pump out of MFO line after hydrotesting, the material from the line back flowed to pump out system sump and overfilled containment and then discharged into Puget Sound. The MFO line was immediately blocked in line and sump pumps were started. Notified authorities, activated spill response team, and Clean Sound was also called for cleanup. Spent next couple of weeks removing oily seaweed, cleaning beaches. Cleaned up per U.S. Coast Guard and Ecology specifications.
5/21/98	10 bbl	Wash gas (crude unit 1st cut, naphtha).	West of Lab building where wash gas line goes underground.	Leaking line. Hydrocarbon odors from lab drains were causing headaches. Found oil stain on ground at the wash gas line. Dug trench where line went underground and for 1-2 weeks removed any water and oil that seeped out. Installed a curtain drain with a suck out well. Installed new wash oil line in trenches. Continuing periodic suck out of curtain drain well. No more oil collecting. Odors stopped.
1/13/99	2000 bbl	Diesel	From roof vent of tank 300x37 to area around tank w/flow channels to tank farm sump.	Stuck level gauge. While refilling tank 300x37, just back in operation from rebuilding, the operator discovered diesel spouting out roof vent. The new tank level gauge had hung up at about the 35' level and therefore did not trigger high level alarm. Tosco immediately shutdown refilling, notified agencies, and activated clean up. Material outside the tank dike area was collected with an adsorbent booms, sand, and plastic sheeting. This area was washed down and vacuum trucked to a clean tank. Inside the dike area the diesel was washed into the tank farm sump. This sump opens oily sewer, which drains to an oil/water separator. Most of the diesel was recaptured. Over the next few weeks the tank dike area and soil was subjected to soap-water washing. Did MTCA IRAR confirming clean up to IP TPH std.

Date	Amount	Material Spilled	Location of Spill	How Resolved
7/13/99	83 bbl	Virgin Gas Oil (VGO)	Crude transfer line in tank farm. Collected in tank farm sump.	Closed crude tank inlet valve. VGO was discharged to the ground at start of an offloading of VGO from a tanker. The discharge was to ground inside crude hill tank farm dike. Immediate response was to shut down the transfer pumps and to open the tank inlet valve. Clean up was initiated at daylight. Water washed the free oil to the land farm sump and skimmed oil off of the sump. Excavated the oi stained soils. Submitted MTCA IRAR confirming clean up met IP TPH std.
12/15/99	5000 gal	Oily process & storm surge water.	South Manhole on overflow line at top of cut.	Storm. Stormwater overwhelmed the lift station and was routed to the beachhea overflow tank. When the beachhead emergency overflow valve closed, the overflow line filled quickly, pressurized the south overflow manhole and allowed mixture of storm and oily water to flow south overground to the stormwater ditch Flow continued until the overflow line from the beachhead emptied. Vacuum trucks were immediately dispatched to remove the liquids. Adsorbent booms were placed on the stormwater ditch and adsorbent pads were also put in the puddle areas. The used adsorbents were collected, washed, squeezed, and disposed. Stained soil was excavated and disposed via thermal destruction. The manhole was isolated, cleaned and repaired. Tosco installed an isolation valve i sewer line upslope of the overflow manholes to prevent overpressure.
3/29/00	3 bbl	Oily process slop oil and water mixture.	Overflow manhole on north side of 6th Street at the top of cut.	Faulty level indicator. Phenolic lift station (PLS) lost level indication, filled and overflowed into the line to overflow tank 300X40. The 300X40 tank inlet emergency overflow valve (EOV) was closed which caused the overflow line to f and overflow the manhole. The slop oil and water flowed down the cut and onto 6th Street along the pipeway. The EOV to tank 300X40 was opened, the PLS pumps were manually restarted and the release was stopped. The area was cleaned up using adsorbents, vacuum trucks, followed by a soap-water wash int the south storm basin. The PLS level indicator was cleaned and repaired and th manhole cover was resealed.

WASTEWATER CHARACTERIZATION

The following tables summarize the wastewater characterization presented in the NPDES permit renewal application form. Additional monitoring information is available in **Appendix D.**

Table 1: Wastewater Characterization of Outfall 001

Parameter for Outfall 001	**# of Samples**	**Maximum Daily Concentration**	**Long Term Average Concentration**
Biochemical Oxygen Demand (BOD) mg/l	166	73	26
Chemical Oxygen Demand (COD) mg/l	350	150	52
Total Organic Carbon (TOC) mg/l	1	18	
Total Suspended Solids (TSS) mg/l	350	52	11
Ammonia (as Nitrogen) mg/l	350	18	4
Temperature °C	Cont. Cont.	23.0 (winter) 31.0 (summer)	18.9 (winter) 27.6 (summer)
Fecal Coliform (colonies/ 100 mls)	105	50	4
Antimony µg/l	1	≤ 60	
Arsenic µg/l	1	≤ 100	
Beryllium µg/l	1	≤ 5	
Cadmium µg/l	1	≤ 5	
Total Chromium µg/l	94	100	30
Copper µg/l	1	29	
Lead µg/l	1	≤ 50	
Mercury µg/l	1	≤ 0.2	
Nickel µg/l	1	≤ 40	
Selenium µg/l	1	≤ 150	
Silver µg/l	1	≤ 10	
Thallium µg/l	1	≤ 150	
Zinc µg/l	1	60	
Cyanide µg/l	1	≤ 50	
Phenols µg/l	350	60	20
Oil and Grease mg/l	350	9	2
PH	Cont.	6.1 Minimum	9.1 Maximum
No priority pollutant organics were found in detectable quantities, except			Chloroform at 1.7 µg/l

Table 2: Wastewater Characterization of Outfall 002

Parameter for Outfall 002	# of Samples	Maximum Daily Concentration	Long Term Average Concentration
Biochemical Oxygen Demand (BOD) mg/l	1	≤ 1	
Chemical Oxygen Demand (COD) mg/l	1	35	
Total Suspended Solids (TSS) mg/l	1	14	
Ammonia (as Nitrogen) mg/l	1	0.9	
Nitrate/Nitrite mg/l	1	1.7	
Total Phosphorus mg/l	1	≤ 10	
Sulfide mg/l	1	≤ 1	
Temperature °F	1	43.0	
Fecal Coliform (colonies/ 100 mls)	1	70	
Total Chromium µg/l	1	≤ 10	
Hexavalent Chromium µg/l	1	≤ 10	
Phenols µg/l	1	≤ 50	
Oil and Grease mg/l	1	≤ 1	
PH	1	6.5	
No priority pollutant organics were found in detectable quantities.			

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The more stringent of these two limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent**.**

Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, or do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect any additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria. A treatment system engineering study and report is a requirement of this reissued permit. The data collected for the study will allow an evaluation of the efficiency of the wastewater treatment system and it's capabilities and design capacity. Samples of influent and effluent will be analyzed for conventional pollutants, priority pollutants, and some specific pollutants found at refineries. Flow monitoring done at the time of sampling will provide information on how the system operates at different hydraulic or organic loading rates. Phillips will be required to calculate treatment and removal efficiencies from the results of the analysis and submit the data to Ecology. The Department will review the data and compare it to published information on wastewater treatment efficiencies. If it is found that the Permittee's effluent plant is performing below acceptable levels, Ecology will require Phillips to upgrade their wastewater treatment system.

In addition to the treatment efficiency study, Ecology is requiring the Permittee to prepare and submit an engineering report on their wastewater treatment system in accordance with Chapter 173-240 WAC. Based on the treatment efficiency study and any other relevant information the refinery will evaluate the actual design capacity of the system.

The Department will consider requiring a treatment efficiency study and engineering report during each permit cycle as a means of continually evaluating the adequacy of the wastewater treatment at the Phillips refinery.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

PROCESS WASTEWATER

The effluent limitations for the Ferndale Refinery are based on Best Conventional Pollutant Control Technology (BCT), Best Available Technology Economically Achievable (BAT), Best Practicable Control Technology Currently Available (BPT), and New Source Performance Standards (NSPS) developed by the Environmental Protection Agency (EPA).

Guidelines were published August 12, 1985 under 40 CFR Part 419 by the Environmental Protection Agency (EPA) for the cracking subcategory of petroleum refining. These limitations are based on terms of a settlement agreement dated April 17, 1984, between EPA and the Natural Resources Defense Council resolving litigation about the EPA guidelines. The August 12, 1985 guidelines establish Best Available Technology (BAT) and Best Conventional Technology (BCT) as equal to Best Practicable Technology (BPT) for all parameters except phenols and chromium. Phenols and chromium are regulated by whichever guideline is more stringent. All known, available, and reasonable methods to control toxicants in the applicant's wastewater shall be used.

The federal effluent guidelines for petroleum refining were promulgated in 1982. In cases where the effluent guidelines are over 5 years old, Ecology reviews the EPA development documents and compares them with the production processes, the pollutants generated, the treatment efficiencies and the unit process design. This procedure allows for verification that the effluent guidelines meet the intent of RCW 90.48.520 (AKART). In preparation of the Phillips permit, Ecology compared current information on the Ferndale Refinery with the data that was used as the basis for the existing guidelines.

In 1996, EPA completed a study of the petroleum refining industry (EPA-821-R-96-015) including treatment technologies, pollutants discharged, pollutant loadings, and potential water quality impacts. Based on this review, the petroleum refining industry was not selected as a candidate for revised effluent guidelines in EPA's biennial plan for 1998 through 1999. EPA determined that the best treatment technology currently available is essentially the same as that applied at the time the effluent guidelines were originally promulgated. They found that if the wastewater treatment systems at the refineries are properly operated and maintained, priority pollutants will be removed or treated to negligible or below detectable levels.

It is Ecology's determination that the Ferndale Refinery is applying AKART in treating their wastewater. Ecology made this determination through an analysis of current refinery conditions and comparison to the effluent guidelines development document. EPA's study conclusions also support Ecology's determination.

Ecology has also applied new source performance standards on the basis of AKART, which makes the permit limitations more stringent than those applied in other states. The more stringent new source performance standards have been applied to all crude throughput increases since 1984.

Ecology has also decided to include an NPDES permit condition to require that Phillips submit an engineering report that provides predicted design capacities for their wastewater treatment system based upon current operating conditions. This permit condition also requires that Phillips collect additional treatment unit influent and effluent data. The data will be evaluated to determine current treatment unit operating efficiencies. This permit condition will ensure that Phillips is continuing to apply AKART to their wastewater.

Since the previous NPDES permit was issued on March 1, 1990, Phillips's crude oil throughput rate has increased from 74,600 bbls/day to a current operating rate (12-month average) of 89,530 bbls/day.

Phillips has also notified Ecology of their intent to replace the existing Thermofor Catalytic Cracking Unit (TCCU) with a new Fluidized Catalytic Cracking Unit (FCCU) scheduled for completion in 2003 and construct associated Clean Fuels projects, which are scheduled for completion sometime in 2004. These projects will enable Ferndale Refinery to produce lower sulfur fuels, which will indirectly reduce air and water pollution from combustion engines. With these changes, production may increase to 100,000 bbls/day crude throughput. There will be some increase in cyanide levels and may be an increased wastewater flow of 0.0878 MGD unless specific water conservation measures are included with the FCCU project.

Size and process factors are multiplied by the actual feed stock to obtain an adjusted feed stock used in determining effluent limitations, except for determining BAT limitations for phenols and chromium. The size and process factor determination for Phillips is documented in **Appendix E**.

The rate changes in refinery processes are shown in the table below along with the applicable size and process factors selected from the EPA guidelines:

	1984 Baseline	1990 Permit	Proposed Permit
Actual Feed Stock, bbls/day	73,000	74,600	89,500*
Desalting, bbls /day	73,000	74,600	89,500
Atmospheric Distillation, bbls/day	73,000	74,600	89,500
Vacuum Distillation, bbls/day	20,000	29,400	42,600
Cracking, bbls/day	22,000	23,3000	27,500
Catalytic Reforming, bbls/day**	11,000	12,700	15,400
Hydrotreating, bbls/day**	5,000	5,100	26,700
Alkylation, bbls/day	0		4,200
Process Factor	0.74	0.74	0.74
Size Factor	1.04	1.04	1.13
Adjusted Feed Stock, bbls/day	56,181	57,400	74,840
New Source Performance Standards Increment, bbls/day			18,659

* All feedstock rates specified in this permit represent actual crude throughput less slop oil and other recycled material.

** Baseline values for these processes are used to calculate BAT limitations for phenols and chromium.

Increases in the feedstock rate are subject to limitations determined by Ecology to be the treatment level obtained from using all known available and reasonable treatment methods. They are therefore subject to New Source Performance Standards. These limitations were calculated by multiplying the increase in adjusted feed stock (current level of 74,840 bbls/day – 1980 baseline of 56,181 bbls/day = 18,659 bbls/day) by New Source Performance Standards (NSPS). The resulting NSPS increment, based upon 18,659 bbls per day, was then added to BAT and BPT limitations, based upon the adjusted baseline feedstock rate of 56,181 bbls per day. BCT limitations were not included because they are equivalent to BPT limitations.

The EPA/NRDC settlement agreement provided separate factors for calculating phenols, total chromium, and hexavalent chromium for the BAT limitation. These calculations required rate data for additional processes including hydrotreating and catalytic reforming. This information is included in the preceding table.

The permit limit calculations are tabulated in **Appendix E**. The actual permit limit is the most stringent of the BAT and BPT determinations. The proposed effluent limitations are listed in the table below in pounds per day.

PARAMETERS	2001 PERMIT at 89,500 bbls/day	
	Monthly Ave.	Daily Max.
Biochemical Oxygen Demand (5-day) , lbs/day	370	665
Chemical Oxygen Demand , lbs/day	2550	4930
Total Suspended Solids, lbs/day	295	460
Oil and Grease, lbs/day	110	200
Oil and Grease, mg/l		15
Phenolic Compounds, lbs/day	2.20	4.94
Ammonia as N, lbs/day	225	494
Sulfide, lbs/day	2.0	4.3
Total Chromium, lbs/day	5.9	10.0
Hexavalent Chromium, lbs/day	0.37	0.81
Fecal Coliform, colonies/100 mls	200	400
pH	In the range of 6.0-9.0	

Phillips will also be required to report information about several other parameters in their monthly DMR. These parameters have no limits established in the permit. Data on crude feedstock rate is needed to evaluate changes and to determine technical discharge limits in the next permit. The ballast water flow rate and total flow rate are needed to determine the amount of additional allocation allowed for several parameters. Rainfall data is collected to determine if the stormwater allocation can be used. The temperature of the discharge and fecal coliform concentrations are needed to evaluate compliance with water quality standards in the receiving water.

In the previous permit, phenols, total chromium and hexavalent chromium were further limited such that the combined discharges for process wastewater, ballast water and stormwater were not allowed to exceed the sum of the NSPS increment plus what was calculated as BPT for the baseline permit.

In 1994 the Ferndale Refinery discontinued using chromium in their cooling water treatment program. This has significantly reduced the amount of chromium discharged into the wastewater system.

Since the Ferndale Refinery discontinued using chromium in their cooling water the concentrations of chromium in the final effluent have dropped to nearly zero. During the three-year period of 1997 and 1999, total chromium was detected three times at 0.1, 0.1, and 0.3 pounds/day.

Based on this performance the stormwater allocation for chromium has not been included in the permit. Phillips will be limited to the more stringent BAT chromium allocations for the process wastewater with no stormwater allocation.

If the feedstock rate falls below the current rate of 89,500 bbls/day for three consecutive months the permit may be reopened to include modified limitations.

BALLAST AND STORMWATER ALLOCATIONS

Stormwater from process areas is collected and treated at the wastewater treatment facility. Stormwater from the roadways and process areas are collected and diverted into the stormwater sewer system. Stormwater from the tank farms can be directed to the stormwater sewer system if clean or to the process sewer system if contaminated. Water in the stormwater sewer flows through a stormwater observation channel. At the observation channel the stormwater can be diverted in a number of ways. "Clean" stormwater is discharged to the final holding pond and then to the final outfall (001). If the stormwater contains high TSS levels, oil, or other pollutants of concern it is discharged to the stormwater surge basin where it receives additional testing and then is routed to the process wastewater treatment system or to the final holding pond depending on the pollutant loading. Any oil or grease floating on the surface of the stormwater in the observation channel is skimmed and diverted to the oily water surge tank.

Ballast water is pumped from the ship to a beachhead tank. Records of the tank level are recorded and maintained by the facility.

The ballast water is then pumped up and mixed with the pretreatment water, which then goes to the wastewater treatment system. It is very infrequent that the Ferndale Refinery receives ballast water. Stormwater is not directly measured at the facility. Direct measurement would be difficult since a portion of the stormwater is diverted to different flow pathways or process wastewater treatment.

The stormwater flow is calculated by the subtraction of the dry weather flow from the total flow discharged each day. This dry weather flow is used during storm events to estimate the volume of stormwater. A dry weather flow was determined by conducting a linear regression with data collected (flow, rainfall, surface area, crude input rates) during the 3 year period ending December 31, 2000. Dry weather flow rates of 1.25 MMGPD have been proposed for crude throughput rates of 89,500. When the FCCU is operating the dry weather flow will change. Phillips will submit to the Department information to calculate the new dry weather flow rate. Phillips has estimated that an additional process wastewater flow of 0.0878 MMGPD will result from the new FCCU.

Parameters	Stormwater Allocation lbs/million gallons		Ballast Water Allocation lbs/million gallons	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Biochemical Oxygen Demand (5-day)	220	400	210	400
Chemical Oxygen Demand	1500	3000	2000	3900
Total Suspended Solids	180	280	170	260
Oil and Grease	67	130	67	126
Phenolic Compounds	-	-	1.4	2.9
Total Chromium	-	-	1.8	5.0
Hexavalent Chromium	-	-	0.23	0.52

The ballast and stormwater allocations in the permit are based on guidelines in 40 CFR 419.12(c) and 419.22(e). The allocations for stormwater only apply to runoff from areas associated with industrial activity, not outlying areas such as parking lots and surrounding acreage.

During the months of June through October Phillips will only be allowed to claim the stormwater allocation when it can be demonstrated that measurable rainfall has occurred at the refinery site during the previous 7 calendar days. In the event that an accumulation of stormwater should need to be discharged when rainfall has not occurred during the previous 7 days, Phillips will be allowed to submit operational data to justify use of the allocation. Should the on-site means of measuring rainfall be unavailable due to equipment malfunction, rainfall data from local amateur weather watchers or the National Weather Service station at Blaine may be used.

STORMWATER DISCHARGE MONITORING

In August 1990, the Ferndale Refinery submitted a Storm Water Study Plan to Ecology. In the study plan, the Ferndale Refinery identified four drainage areas within the refinery properties, where stormwater is routed to the industrial wastewater treatment system. The Ferndale Refinery reported that only one of the four drainage areas has any run-off waters that can be associated with industrial activity. This area has been designated in the Storm Water Study Plan as the "East Area". The three other drainage areas (Northwest Area, Southwest Area, and South Area) have stormwater run-off associated with woodlands and wetlands areas and are not exposed to contamination from any industrial activities.

The Ferndale Refinery collected discharge samples from the East Area for characterization on January 15, 1992. The sampling event met the requirements of the 1991 USEPA Storm Water Monitoring regulations. The East Area drainage is adjacent to the Lake Terrell Road and has a surface area of about 413 acres. The stormwater discharge exits the refinery property at a culvert under Slater Road about 900 feet west of Lake Terrell Road. After the culvert, this run-off water traverses farmlands and eventually enters the northwest end of Lummi Bay via an unnamed tributary.

Stormwater from the East Area includes run-off from a closed fill and grade area, run-off from areas where some crude oil and other hydrocarbons have been previously spilled, drainage from stormwater ditches which pass adjacent to process areas, and drainage from an equipment storage yard.

The Ferndale Refinery collected both grab and composites samples and tested for the following parameters: BOD, COD, TSS, total kjeldahl nitrogen, ammonia nitrogen, nitrate and nitrite nitrogen, phosphorus, phenolic compounds, oil and grease, sulfide, total organic carbon, total chromium, hexavalent chromium, zinc, fecal coliform, pH, and temperature.

Analytical results indicate that the runoff from the East Area is similar in composition to non-industrial runoff in the area. One parameter, fecal coliform, was more elevated than expected and may be associated to run-on from the pastureland area. Monitoring of this discharge will be required in the permit and Phillips will be required to sample twice annually during a qualifying storm for the following parameters: oil & grease, BOD, COD, pH, fecal coliform, and TSS. The results of the semiannual sampling will be evaluated to check that the quality of the discharge from the east area remains of a non-industrial nature. If after two years of sampling no problems are noted, the sampling can be reduced to once per year with Departmental approval. **Appendix C** is a map of the stormwater outfalls on the refinery property.

CLEAN WATER DISCHARGE

The clean waters occasionally generated at the refinery amount to a large volume of water that can dilute the process water and reduce the efficiency of the wastewater treatment system.

The largest potential sources of clean water are storage tank hydrotest water and fire system test water, although there may be others. Under certain conditions Phillips may be able to justify directly discharging these types of clean water streams, such as when their wastewater system is experiencing heavy hydraulic loadings or when local wildlife managers request water to keep local streams or ponds viable for habitat during very dry summer conditions. Prior to authorizing the discharge from one of the stormwater outfalls, the Department must receive detailed information on the source and nature of the water, including volume, chemical analysis, and which stormwater outfall will be used for the discharge. The water must meet the applicable water quality standards for the receiving water. Phillips is also encouraged to find other ways to reuse these streams if it is technically and economically feasible to do so.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Surface water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The U.S. EPA has promulgated 91 numeric water quality criteria for the protection of human health that are applicable to Washington State (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

Phillips discharges treated wastewater and stormwater from Outfall 001 to the Straits of Georgia which is designated as a Class AA marine receiving water in the vicinity of the outfall. Tenaska, a cogeneration facility, also discharges wastewater and stormwater to the Straits of Georgia via the Ferndale Refinery's outfall line. Other nearby point source outfalls includes ARCO Petroleum Products Company and Intalco Aluminum Company. Characteristic uses include fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

The stormwater outfall (002) from the East Area, discharges into a culvert which runs under Slater Road and then drains into an unnamed tributary which is classified as a Class AA freshwater receiving water. Characteristic uses include water supply (domestic, industrial, agriculture); fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; and aesthetic enjoyment. Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

This unnamed tributary then discharges to Lummi Bay which is designated as a Class AA marine receiving water.

The closest Department of Ecology long-term core monitoring station is BLL009 in Bellingham Bay. This station is influenced by activity in Bellingham and is not suitable for a background data station. The next closest long-term core monitoring station is GRG002, located in the Georgia Strait. There is substantial data for this station. The closest long-term rotating station is LOP001 in Lopez Sound.

Background receiving water data for metal parameters was obtained from a study undertaken by a group of Washington State refineries. The study included 10 samples taken at three different locations within the Puget Sound, in an effort to provide representative information about the receiving water outside the influence of the refineries. The sampling period was chosen to represent the critical period in the receiving water. The study was completed in the fall of 1997 and results were submitted to Ecology in March 1998.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliform	14 colonies/100 ml (marine water) and 50 colonies/100 ml (fresh water) maximum geometric mean
Dissolved Oxygen	7 mg/L (marine water) and 9.5 mg/L (fresh water) minimum
Temperature	13 degrees Celsius (marine water) and 16 degrees Celsius (fresh water) maximum or incremental increases above background
PH	7.0 to 8.5 (marine water) and 6.5 to 8.5 (fresh water) standard units
Turbidity	Less than 5 NTU above background
Toxics	No toxics in toxic amounts (see Appendix K for numeric criteria for toxics of concern for this discharge)

Lummi Bay and the Straits of Georgia are listed on the 1998 CWA 303(d) list. Fecal coliform is the pollutant of concern in Lummi Bay, which needs to be addressed by the total maximum daily load (TMDL) process. The Strait of Georgia is listed for a variety of pollutants found in the sediments at the Intalco Aluminum Company. The following pollutants were found in the sediments around the Intalco discharge outfall: phenanthrene, pyrene, indenol (1,2,3-cd) pyrene, dibenzo (a, h) anthracene, benzo (g, h, i) perylene, benzo (a) pyrene, benzo (a) anthracene, chrysene, fluoranthene, benzo (b, k) fluoranthene, phenanthrene, acenaphthene, total PCBs, dibenzofuran, cadmium, and fluorene. The Strait of Georgia was also listed for a sediment bioassay failure at the edge of the mixing zone of the Ferndale Refinery Refinery.

Intalco completed a sediment analysis plan, has taken some additional samples, and has submitted a report. Ecology is evaluating the data and may require some additional sediment monitoring to be completed by Intalco. ARCO also had additional sediment monitoring included in its recently issued permit. A sediment recharacterization will be included in this permit.

PROCESS WASTEWATER DISCHARGE – OUTFALL 001

Pollutant concentrations in the proposed discharge meet water quality criteria with technology-based controls that the Department has determined to be AKART when factoring in the applicable dilution available at the discharge outfall. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC.

In November 1995 an engineering consultant prepared a dilution analysis for the Ferndale Refinery. The report was entitled, **Final Report** Dilution Ratio and Reasonable Potential Analysis.

The dilution factors of effluent to receiving water have been determined at the critical condition by the use of several different EPA approved mixing models. (It is noted that Tenaska, a cogeneration facility of steam and electricity has been authorized and permitted to discharge it's effluent into The Ferndale Refinery's discharge line. This report has included the input from Tenaska discharge.) Following Ecology review and comments, the mixing zone values were determined for the Phillips facility. The mixing zone values are tabulated as follows:

	Available Dilution
Acute Criteria	30
Chronic Criteria	135
Human Health Criteria – Carcinogen	135
Human Health Criteria - Non-carcinogen	135

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of surface water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The impacts of temperature, pH, chlorine, and metals were determined as shown below, using the dilution factors at critical conditions described above.

Temperature

For Class AA marine water, the water quality standards state the temperature shall not exceed 13°C due to human activities. When natural conditions exceed 13°C no temperature increases will be allowed which will raise the receiving water temperature greater than 0.3°C. Incremental temperature increases resulting from point source activities shall not, at any time, exceed $t = 8/(T-4)$. T represents the background temperature and represents the highest ambient water temperature in the vicinity of the discharge.

A simple mixing analysis at critical conditions modeled the impact of the discharge on the temperature of the receiving water. The receiving water temperature critical condition was determined using the 90th percentile value of the temperatures recorded at the ambient monitoring station GRG002. The receiving water temperature at the critical condition is 13.3°C and Phillips's maximum summertime effluent temperature is 25.6°C and Tenaska's is 27.2°C. The following analysis was complete using average flow values for each facility (Phillips 1.5 MGD, Tenaska 0.117MGD). Under average conditions Phillips's flow contribution is approximately 92% of the total flow discharged. With a dilution of 135:1 at the edge of the chronic zone the predicted resultant temperature at the boundary of the chronic mixing zone is 13.4 °C. This was calculated using a simple mass balance equation as follows: $[13.3(135) + 25.6(.92) + 27.2(.08)]/136 = [13.3(135) + 25.7]/136 = 13.4$°C. This temperature meets the water quality standards.

The highest recorded temperature at GRG002 (from 1988 to 1993) was 19.3°C. The incremental temperature increase allowance (t = 8/(19.3-4)) is equal to 0.5°C. With a receiving water temperature of 19.3°C and a combined effluent temperature of 25.7°C the predicted temperature at the edge of the dilution zone is equal to 19.35°C. This was calculated using a simple mass balance equation as follows: [19.3(135) + 25.7(1)]/136 = 19.35°C. The temperature increase of 0.05°C is less than the incremental temperature allowance (0.5°C) or the maximum allowable increase of 0.3°C allowed by water quality standards. Under these conditions there is no predicted violation of The Water Quality Standards. An effluent limitation was determined not to be necessary.

Fecal Coliforms--The refinery is required to meet domestic technology-based effluent limits for fecal coliforms in their effluent since domestic wastewater is treated in their wastewater facility. Domestic wastewater standards are established in Chapter 173-221 WAC, entitled "Discharge Standards and Effluent Limitations for Domestic Wastewater Facilities". Domestic effluent limits, for fecal coliforms, are 200 colonies/100ml on a monthly basis with a maximum of 400 colonies/100 ml in any one sample. The water quality standard for marine Class AA receiving waters is 14colonies/100 ml. Phillips is required to meet this water quality standard at the edge of the chronic zone. With a dilution of 135:1, the predicted fecal coliform concentration at the boundary of the chronic mixing zone is 2.9 colonies/100 ml, if the maximum technological concentration standard of 400 is met. This value was calculated using a simple mass balance equation as follows: {0(135) + 400(1)]/136= 2.9. The technological standard is therefore protective of the water quality standard.

BOD_5--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Turbidity--The impact of turbidity was evaluated based on the range of turbidity in the effluent and turbidity of the receiving water. Due to the large degree of dilution, it was determined that the turbidity criteria would not be violated outside the designated mixing zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The Department has determined through review of available data and knowledge of the refinery process that the applicant has the following pollutants: ammonia, arsenic, cadmium, chloroform, chromium, copper, cyanide, lead, mercury, nickel, selenium, sulfide, silver, and zinc in their effluent. A reasonable potential analysis (See **Appendix I**) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for the parameters listed above to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 at the critical condition.

Ammonia will be discussed more specifically below. The critical condition in this case occurs in May through October. Valid marine ambient background data was available for metal parameters (Batelle, 1998) and ammonia.

Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge (001) to cause a violation of water quality standards. This determination assumes that the Permittee meets the other effluent limits of this permit.

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at http.www:wa.gov.ecology.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

Ammonia--Ammonia is considered to be a toxic pollutant and was evaluated for reasonable potential to exceed water quality standards. Determining the site specific acute and chronic criteria for ammonia is slightly more complicated than simply obtaining the criteria from the regulations and comparing to the effluent data. Ammonia's toxicity is dependent on that portion which is available in the unionized form. The amount of unionized ammonia is dependent on the pH, dissolved oxygen, and salinity of the receiving water in the marine environment. In order to evaluate ammonia toxicity, receiving water information must be used.

Two ambient receiving water stations were evaluated to determine the site-specific acute and chronic criteria and to obtain background ammonia data. The Ecology ambient monitoring stations GRG002 and LOP001 were used in this analysis. GRG002 is located in the Georgia Strait and is a long-term core station for which substantial data exists. LOP001 is located near Lopez Island and represents an area similar to the location of Phillips's discharge but remains largely unimpacted by pollution. Using Hampson's model in a spreadsheet form, the acute and chronic ammonia criteria were calculated. From those criteria, the 90th percentile value was chosen to represent the critical condition as recommended by the Ecology Permit Writer's Manual. The values for both ambient stations and the 90th percentile values for background total ammonia concentration were used in the reasonable potential calculation shown in **Appendix G**.

Effluent ammonia data was used as part of the evaluation. Effluent ammonia is measured each day at the Ferndale Refinery refinery. In order to determine reasonable potential, several statistics are necessary. To estimate the coefficient of variation and the maximum effluent concentration, twelve months of data (January 1993 – December 1993 - 365 data points) was used. The coefficient of variation is the standard deviation divided by the mean and is a measure of the variability of the parameter in the effluent. The 95% value for the ammonia concentration was 1.78 mg/l. The highest ammonia level ever detected by Tosco was 18.0 mg/l and was before the current treatment system was operational.

Using all of the above information, a reasonable potential was determined. With the available dilution, it was determined that there is no reasonable potential for Phillips to exceed water quality standards for ammonia at the edge of the dilution zone. The waste load allocation for ammonia at the edge of the acute zone is approximately one hundred and thirty times higher than current effluent data and the waste load allocation at the edge of the chronic zone is approximately eighty eight times higher.

Using the highest detected value of 18.0 mg/l, the WLA at the edge of the acute zone be approximately thirteen times higher than effluent data and the waste load allocation at the edge of the chronic zone is approximately nine times higher. This analysis is attached in **Appendix G**.

With the available dilution at Phillips, the technology based effluent limit for ammonia is sufficiently protective of water quality standards.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC_{50}, $EC_{50,}$ IC25, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

The WET tests during effluent characterization (see **Appendix H**) indicate that no reasonable potential exists to cause receiving water acute toxicity, and the Permittee will not be given an acute WET limit and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that acute toxicity has not increased in the effluent.

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water chronic toxicity, and the Permittee will not be given a chronic WET limit. The effluent characterization was completed in 1991 and does not meet current test requirements in WAC 173-205-060. Therefore, Phillips will be required to test for chronic toxicity six (6) times prior to application for permit renewal.

For the 1991 testing, the refinery conducted a one year chronic WET characterization study with quarterly sampling and testing using a prescribed definitive dilution series and three organisms. The three organisms tested were sheepshead minnow, oyster larvae, and echinoderm sperm. The following are the results of the chronic characterization study:

SAMPLE DATE	SHEEPSHEAD MINNOW NOEC on Effluent	OYSTER LARVAE NOEC on EFFLUENT	ECHINODERM SPERM NOEC on EFFLUENT
3/19/91	100		
8/27/91	100	10	50
3/22/91		< 6.25	< 6.25
5/14/91 - 5/17/91	100	6.25	25
9/26/91			100

If the Permittee makes process or material changes (i.e., startup of the FCCU) which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal.

Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard". The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

CHERRY POINT HERRING ISSUES

Over the last 20 years, there has been a 95 % decline in the herring stock which spawn in the Cherry Point area. Ecology is currently working with the Department of Fish and Wildlife (WDFW) and the Department of Natural Resources (DNR) in an ongoing risk assessment process. During development of the risk assessment, several potential stressors were identified. Included in this list was pollution from industrial and municipal discharges. To address these concerns, water permits will include studies to determine if there are any impacts from the effluent from existing industries on herring in the Cherry Point area.

One of these studies is a herring embryo and larval toxicity test. Phillips will be required to do herring embryo and larval toxicity testing.

Ecology, DNR, and WDFW are currently using an ecological risk assessment model as a further tool for evaluating impacts from existing and proposed industries on the aquatic life in the Cherry Point area. Input to the model would include information from field sampling, water quality modeling, and other studies. The agencies are planning to work cooperatively with all stakeholders in this effort.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that Phillips's discharges are unlikely to contain organic chemicals regulated for human health and does not contain most chemicals of concern based on several priority pollutant scans and our knowledge of the industry. The only detectable organic, chloroform, does not have a potential to exceed the criteria at the chronic mixing zone. A worst case analysis of the discharge using the available mixing zone and the detection limit of the analysis showed some parameters, which if present at the detection limit would exceed human health criteria at the edge of the mixing zone (see **Appendix I**). These parameters, with the exception of arsenic, were not detected and are highly unlikely to be present in this discharge considering the nature of the industry inputs. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

Arsenic--In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 µg/L inorganic arsenic, and is based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 µg/L, and is based on exposure from fish and shellfish tissue and water ingestion.

These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 50 µg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

1. Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria. The upcoming revision of the MCL for arsenic offers a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers. This discussion should focus on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources.

2. Additional and more focussed data collection. The Water Quality Program will in some cases require additional and more focussed arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

3. **Data sharing**. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

This permit does not include any limitations for arsenic. Arsenic is measured in Phillips's effluent during Ecology's sampling inspections and will be sampled by Phillips during the permit term as required by other permit conditions.

Dioxin--Dioxins have been found in some Canadian and Californian refinery effluents. The dioxins were traced to an internal waste stream from the regeneration of catalytic reformer units. The design of the Ferndale Refinery catalytic reforming unit is generically referred to as a 'cyclic reformer'. Specifically, it is an Exxon licensed unit, referred to as a 'Powerformer'. The unit has five reactors, which contain the catalyst used in the reforming process. Four of the reactors are in oil operation at any given time with the fifth reactor off line for regeneration. Periodic regeneration of the catalyst is required to burn off coke and restore catalyst activity. Coke deposition is a normal part of the reforming process, which over time deactivates the catalyst. Mechanically, the unit has piping and valving to allow any one of the five reactors to be taken offline and connected to the regeneration circuit. The regeneration circuit consists of a heater, a circulation compressor, two heat exchangers, piping, and valves. During catalyst regeneration, varying amounts of air and nitrogen are added to the circuit to maintain the proper gas mixture for a controlled coke burn. Excess regeneration gases are vented directly to atmosphere through a pressure control valve. Unlike other reformer unit designs, Ferndale Refinery's unit does not incorporate any kind of water and/or caustic wash as part of the regeneration. In other units, the water/caustic wash is used to cool and neutralize the circulating regeneration gas. Ferndale Refinery's regeneration circuit was designed and built to withstand the high temperatures and corrosive nature of the regeneration process. As such, there is no liquid waste stream leaving the regeneration circuit. The only discharge from the regeneration process is the aforementioned venting of excess regeneration gases to atmosphere. Dioxin has not been detected in The Ferndale Refinery's final effluent.

This permit will require Phillips to test for chlorinated dioxins, furans, and associated congeners in the Human Health criteria testing.

Chromium--Chromium use was discontinued in 1989. The only source of chromium in the refinery is the crude oil. Monitoring data have consistently demonstrated very low levels of chromium such that it no longer remains a pollutant of concern. Because it remains in the federal effluent guidelines it must still occasionally be monitored for. Monitoring for this parameter has therefore been reduced to a semiannual frequency.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400). A sediment monitoring study was completed on July 24, 1992. No chemical constituents in the sediment exceeded the Sediment Quality Standards (SQS).

Toxicity testing was also conducted and toxicity was found in one of the transect samples for the echinoderm larval bioassay, but not for either of the polychaete and amphipod bioassay on the same sample. Questions were raised whether or not the demonstrated toxicity was actually due to the sediments. The biggest environmental issue in the Cherry Point area is the demonstrated decline of the Pacific Herring. There have been concerns raised that this decline is due to the pollutants discharged by the local industrial facilities including The Ferndale Refinery.

Because of these questions, Phillips will be required to do a sediment recharacterization study. The Department will review the reported data and will evaluate the results (as specified in the Sediment Management Standards, Part IV: Sediment Source Control, WAC 173-204-400) to determine what or if any source control, monitoring, and/or cleanup actions is required. A condition has been placed in the proposed permit which requires the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

The additional sediment monitoring will be required to be completed towards the end of the permit cycle so that the data will be available for consideration during the next NPDES permit reissuance. Any actions required, as a result of detailed evaluation will be issued via administrative order.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100). All of the ponds in Phillips's wastewater treatment system have unlined native clay bottoms and could potentially discharge to ground water. To determine the need for a groundwater impact study the final effluent was compared to the Ground Water Quality Standards (see **Appendix J**). In that comparison 9 parameters in the final effluent, mainly metals, exceeded the standards before contact with ground water, although data was not available or detected for many of the organic parameters. Pesticides, radionuclides, PCBs, PBBs and dioxin were presumed to be absent or not present in detectable quantities, based on past test results and process knowledge.

Based on the effluent analysis it has been determined that there is a potential for an impact to ground water beneath the wastewater ponds. As a result Phillips will be required to submit a ground water impact study plan to be implemented in the third and fourth year of the proposed permit. The plan must include sampling and testing schedules for all of the wastewater ponds and for all of the parameters included in the Standards (excluding pesticides, radionuclides, PCBs, PBBs and dioxin), and a hydrogeologic investigation to estimate the impact to ground water. If this analysis determines that a potential for the effluent to cause an exceedance of the standards in the ground water exists, Phillips will be required to install monitoring wells to investigate any actual effects on the ground water by the ponds. One year of quarterly sampling will be required, and the results must be submitted to Ecology with 60 days of the last sampling event.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

PERFORMANCE BASED REDUCTION OF MONITORING FREQUENCIES

EPA published guidance in April of 1996 entitled, "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies". EPA's goal is to reduce the regulatory burden associated with reporting and monitoring on the basis of excellent performance. The guidance provides a tool to evaluate the facility's performance. Several parameters in The Ferndale Refinery's treated effluent were evaluated using this guidance. The guidance recommends looking at and comparing long term average values to permit limits. In addition to using the approach recommended in the guidance, maximum values were also compared with permit limits. The following table summarizes data since January 1991 and the current and proposed monitoring frequencies.

Pounds/Day with the exception of Fecal coliform	**BOD**	**Phenol**	**Ammonia**	**Sulfide**	**Fecal Coliform Organisms per 100mls**
Monthly average permit limit in current permit	350	2.2	210	1.9	200
Daily maximum permit limit in current permit	640	4.7	460	4.1	400
Long-term average (1/91 – 3/01) (geometric mean for fecal coliform)	168	0.24	19	0.00	14
Long-term average/ monthly average permit limit (percent basis)	48%	11%	9%	0%	7%
Maximum of the monthly averages	497	1.3	125	0.00	154
Maximum Value	1335	14.7	255	0.00	860
Current permit monitoring frequency	3/7	7/7	7/7	7/7	5/7
Policy monitoring recommendations	1/7	1/7	1/7	1/7	1/7
Proposed permit monitoring frequency	2/7	1/7	1/7	1/7	3/7

For the parameters evaluated, The Ferndale Refinery's monitoring history has demonstrated an ability to consistently meet the regulatory limits and knowledge of the treatment system operation. The proposed monitoring frequencies are based on the guidance recommendations and best professional judgement. For BOD, the long-term average/monthly average (LTA) ratio was close to the 50 % cutoff point (at 48 %) with a maximum value over double the current limit. The LTA was high enough to warrant more frequent monitoring than recommended in the guidance. Total suspended solids, COD and oil and grease will continue to be monitored daily. These parameters will give an indication if the wastewater treatment facility is having a problem. Phillips will be expected to maintain the performance levels to continue to receive the reduced monitoring. If the performance levels of the facility deteriorate, monitoring frequencies will revert to the frequencies in the current permit.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The Ferndale Refinery originally achieved laboratory accreditation on November 1, 1991, and continues to renew this accreditation annually. The last onsite evaluation of The Ferndale Refinery's lab was conducted on March 29, 2001.

The Ferndale Refinery's most recent accreditation was effective on December 13, 2000 and expires December 12, 2001. The Ferndale Refinery is accredited for the following parameters: ammonia, BOD, COD, dissolved oxygen, hexane extractable, O&G, pH, total phenolics, TSS, sulfide, hexavalent chromium, and fecal coliform.

POLLUTION PREVENTION PLANNING

POLLUTION PREVENTION TO DATE

The refinery submitted a Pollution Prevention Plan to Ecology on September 2, 1992 in compliance with the requirements of Chapter 173-307 WAC. Progress reports have been submitted annually. The refinery has worked on pollution prevention and recycling strategies for a number of years.

In 1991, wastewater treatment plant operations generated and disposed of 1.52 million tons of hazardous waste. In 1995, all hazardous wastes generated by wastewater treatment plant operations were either recycled to produce petroleum coke or reused as fuels.

The refinery has implemented a number of pollution prevention projects and strategies that have had a positive impact on wastewater treatment plant operations. Cooling water treatment systems, which formerly used hexavalent chromium, have been replaced with phosphate-based systems. This has resulted in significant reduction in the quantity of chromium discharged to the wastewater treatment plant. In 1992, the refinery replaced the open surge basins with above ground tanks, equipped with external floating roofs with double seals and double bottoms. This allowed for recovery of more oil and reduced the oil loading to the API separators and wastewater treatment system by 99 %.

For more information, the facility's Pollution Prevention Plan is available for public review.

NEW REQUIREMENTS

Although many of the pollution prevention strategies identified and implemented under these requirements also reduce pollutant impacts on water quality, the Permittee has in the past not been directed to specifically review and evaluate facility processes and activities for the source reduction and control of water pollutants.

A water-oriented pollution prevention plan is being required in the proposed permit. Ecology's goals and objectives for developing and implementing pollution prevention plans are to identify, reduce, eliminate, and prevent the generation and release of pollutants to influent wastewater streams, stormwater, and/or waters of the state and to prevent violations of surface water, ground water, and sediment quality standards. The identification, evaluation, and selection of pollution prevention opportunities will be documented in the plan submitted to Ecology. Although crude oil can be considered a hazardous substance, Phillips will not be required to look for raw material feedstock substitutions for crude oil, since refineries have no practical ability to reduce the quantity or toxicity of crude oil.

The plan should comprehensively address all sources of water pollutants. Previous requirements have focused on specific types of sources (e.g., BMPs). These specific requirements are discussed in more detail in the following paragraphs.

While the pollution prevention plan is not limited to these specific areas, it should address them using existing guidance. Phillips will be expected to apply the methodologies from existing guidance to cover other sources, pathways, or measures not covered within the strict scope of that guidance.

The pollution prevention plan requirements include the identification and implementation of Best Management Practices (BMPs). Pursuant to RCW 90.48 and Sections 302 and 402 for the Clean Water Act, BMPs may be incorporated as permit conditions.

BMPs are actions or procedures to prevent or minimize the potential for the release of pollutants or hazardous substances in significant quantities to surface waters. BMPs, though normally qualitative, are most effective when used in conjunction with numerical effluent limits in NPDES permits.

The plan requirements also address stormwater pollution prevention. Ecology has developed guidance for the prevention of stormwater runoff contamination, entitled *Stormwater Pollution Prevention Planning for Industrial Facilities* (September 1993). The pollution prevention plan may incorporate the appropriate sections of any other plans previously developed by the refinery, which include procedures for prevention of stormwater runoff contamination. These plans, however, will not be all inclusive of the BMPs necessary for prevention of stormwater pollution by more conventional pollutants – in particular, total suspended solids. They will also not address "clean" areas of the facility, that is those areas where petroleum products or hazardous materials are not stored or used. These "clean" areas contribute conventional pollutants to the facility's stormwater.

The pollution prevention plan requires a review of solid waste handling and disposal procedures to prevent solid waste and solid waste leachate from causing pollution of state waters. In addition, the plan will include a description of measures already taken to prevent the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

NON-ROUTINE AND UNANTICIPATED DISCHARGES

Occasionally, this facility may generate wastewater, which is not characterized in their permit application because it is not a routine discharge, and was not anticipated at the time of application. These typically are waters used to pressure test storage tanks or fire water systems or leaks from drinking water systems. These are typically clean wastewaters but may be contaminated with pollutants. The permit contains an authorization for non-routine and unanticipated discharges. The permit requires a characterization of these wastewaters for pollutants and examination of the opportunities for reuse.

Depending on the nature and extent of pollutants in this wastewater and opportunities for reuse, Ecology may authorize a direct discharge via the process wastewater outfall or through a stormwater outfall for clean water, require the wastewater to be placed through the facilities wastewater treatment process or require the water to be reused.

OUTFALL EVALUATION

Proposed permit condition S.11 requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to evaluate the extent of sediment accumulations in the vicinity of the outfall.

TREATMENT SYSTEM OPERATING PLAN

In accordance with state and federal regulations, the Permittee is required to take all reasonable steps to properly operate and maintain the treatment system (40 CFR 122.41(e)) and WAC 173-220-150 (1)(g). An operation and maintenance manual was submitted as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). It has been determined that the implementation of the procedures in the Treatment System Operating Plan is a reasonable measure to ensure compliance with the terms and limitations in the permit. The operating plan submitted by Phillips will need to be updated upon issuance of the new NPDES permit. The permit also includes a condition requiring it to be updated and resubmitted with the NPDES permit application.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual industrial NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

LIST OF APPENDICES

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations, which are described in the rest of this fact sheet.

The Department will publish a Public Notice of Draft (PNOD) on November 7, 2001in the ***Bellingham Herald*** and the *Ferndale's* ***Westside Record Journal*** to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. Copies of the draft permit and the fact sheet are available for viewing between 8:00 AM and 4:30 PM, Monday through Friday at the Permit Assistance Center at the Department of Ecology, 300 Desmond Drive in Lacey. Other copies are available for review at the Ferndale Public Library, and at Ecology's Bellingham Field Office in Bellingham. Copies are also available from the Industrial Section by mail, upon request. With the exception of the appendices, copies can be sent electronically if the request is made by e-mail. Written comments should be mailed to:

Don Kjosness
Department of Ecology
Industrial Section
P. O. Box 47706
Olympia, WA 98504-7706

The Department is giving an extra week for comments due to the holiday season. Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty-seven (37) day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty-seven (37) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6955, or by writing to the address listed above.

This permit and fact sheet was written by Don Kjosness.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Responsible Corporate Officer-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C --FACILITY STORMWATER OUTFALL LOCATION MAP

APPENDIX D--WASTEWATER EFFLUENT DATA

APPENDIX E--PROCESS FACTOR DETERMINATIONS

APPENDIX F--TOTAL METALS VALUES

APPENDIX G--REASONABLE POTENTIAL CALCULATION – AMMONIA

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APPENDIX I--REASONABLE POTENTIAL CALCULATION

APPENDIX J—HUMAN HEALTH REASONABLE POTENTIAL CALCULATION

APPENDIX K—GROUND WATER QUALITY STANDARDS

APPENDIX L--RESPONSE TO COMMENTS